

Bad River Natural Resources Department



To: John Colletti, USEPA Region 5
From: Naomi Tillison, Water Resources Specialist *NT*
CC: Phil Livingston, Water and Sewer
Erv Soulier, Natural Resources Director
Date: 2/9/2016
Re: Bypass at the Bad River Wastewater Treatment Plant, November 2014 (NPDES Permit WI-0036587-4)

Bad River Tribe provided notice to U.S. Environmental Protection Agency (US EPA) of the need for an anticipated bypass at the Bad River Wastewater Treatment Plant (WWTP) in order to continue work on upgrades at the WWTP. US EPA approved the anticipated bypass, as meeting the criteria outlined in Part II, Section B.3.d(1)(a-c) of the WWTP's National Pollutant Discharge Elimination System permit. This bypass occurred November 5 through 12, 2014.

The following is an evaluation of the effects:

Prior to the bypass occurring, we calculated the maximum total phosphorus (TP) loading to the Bad River that would result from the discharge. The pump utilized, which was a BJM submersible pump (R400D-115), has a maximum flow rate of 50 GPM. Assuming continuous pumping and the maximum flow rate for the pump could be obtained, a maximum daily load of 2.5 lbs of phosphorus was calculated based on a 4.1 mg/L TP concentration, which was the concentration in the lagoon to be discharged (concentration data was provided by Bad River's Water and Sewer Department), and on an over-estimated total volume of 90,000 gallons to be discharged.

Prior to the bypass occurring, we also calculated a range of TP daily loads that occur in the receiving water, which was the mainstem of the Bad River north of U.S. Highway 2. Flow data for the Bad River was obtained from the USGS gaging station that is operated at Elmhoist Road, which is located approximately 25 river miles upstream of the mouth and upstream of a major tributary (White River) that contributes significant flow. Low flow in the Bad River is around 200 cfs based on the long-term record at gaging station operated at Elmhoist.

The Tribe's Water Resources Program monitored TP concentrations at six different locations on

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the Bad River during 2007-2012 (n=81);¹ two of these locations are downstream of the Tribe's WWTP discharge. The minimum TP concentration recorded during this time period was 0.013 mg/L (Bad River @ Mouth) and the maximum TP concentration measured was 0.59 mg/L (Bad River @ Government Road). Using the conservative flow rate of 200 cfs, TP loads in the Bad River ranged from 14 to 636 lbs/day based on the 2007-2012 monitoring data. It should be noted that the discharge measured in the Bad River on October 26, 2014, was around 400 cfs. In comparison, a TP concentration of 0.15 mg/L was measured on September 3, 2014, during the descending limb of a runoff event when the discharge in the Bad River was 1100 cfs, resulting in 889 lbs of phosphorus in the river on this day.²

Based on the calculations of maximum daily load, the data previously described (e.g., TP concentrations in the Bad River), and assumptions described above, the WWTP construction project members recommended the short-term bypass that was necessary to continue upgrading the WWTP would not adversely impact the Bad River itself.

It should be noted that multiple conservative assumptions were made to ensure the Bad River would not be adversely impacted by the discharge.

The Water and Sewer Department initiated the bypass on November 5, 2014, and concluded on November 12, 2014. The flow rate of the Bad River during this timeframe ranged from 291 to 572 cfs as measured at the USGS station (Figure 1).

¹ The monitoring conducted by the Tribe's Water Resources Program is implemented in accordance with the EPA-approved Surface Water Monitoring Quality Assurance Project Plan.

² Daily loading calculations assume the TP concentration in the river and the flow rate measured at a specific time remain constant throughout the day.

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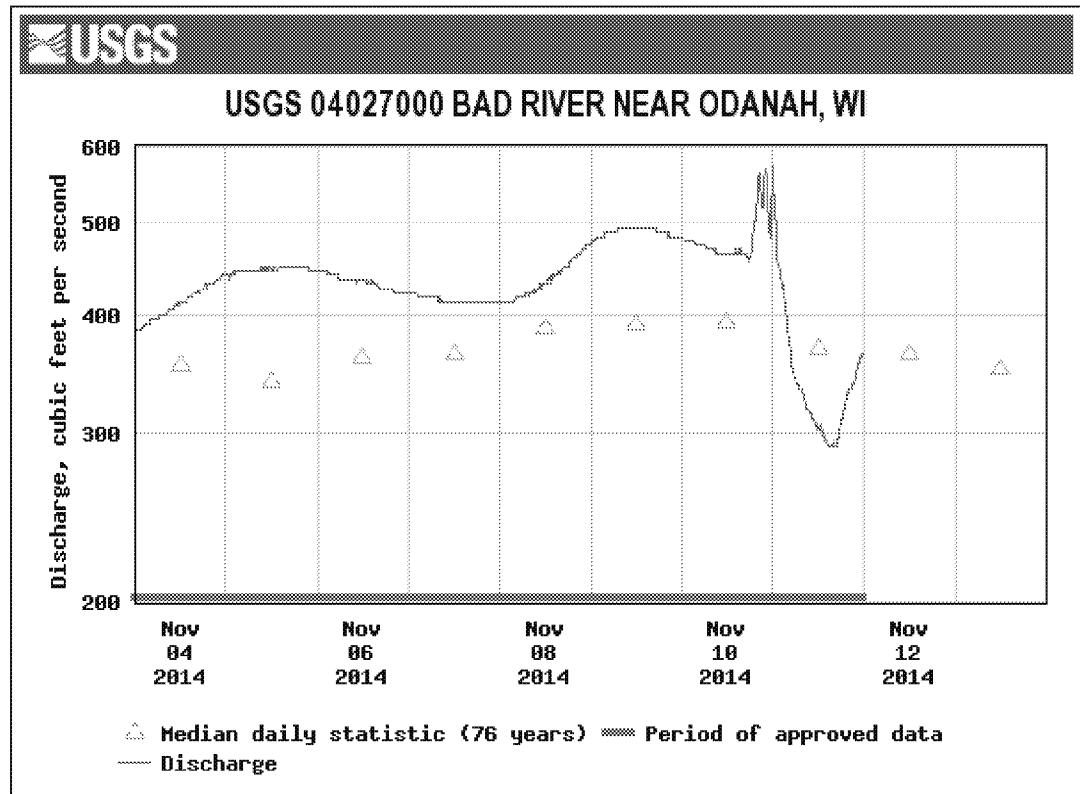


Figure 1: The flow of the Bad River from November 4, 2014, to November 12, 2014, as measured at the USGS station located at Elmhoist Road.³

Prior to, during, and after the discharge, the Tribe's Water Resources Program monitored the TP levels in the Bad River at multiple locations, including sites upstream and downstream of the discharge (Figure 2).⁴ The discharge associated with the bypass occurred just upstream of the Bad River @ SBR monitoring location.

³ Graph produced from USGS National Water Information System, accessed 1/28/2015:
http://waterdata.usgs.gov/wi/nwis/uv?site_no=04027000

⁴ The monitoring conducted by the Tribe's Water Resources Program is implemented in accordance with the EPA-approved Surface Water Monitoring Quality Assurance Project Plan.

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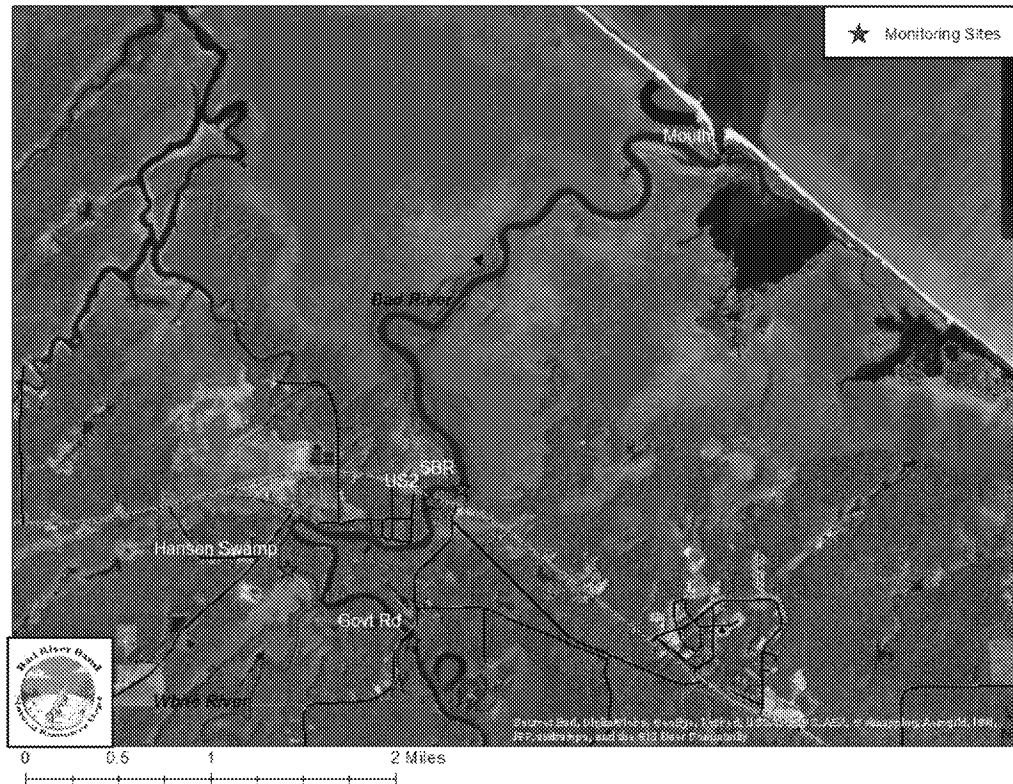


Figure 2: Monitoring sites located near the discharge associated with the bypass.

The TP concentration measured at these monitoring sites from November 4, 2014, to November 13, 2014, were all below the screening threshold of 0.075 mg/L (Figure 3).⁵ The greatest TP concentration recorded was 0.067 mg/L, which was measured at the monitoring station located just upstream of the discharge (Bad River @ Hwy 2) on November 13, 2014. The remainder of the TP concentrations ranged from 0.020 mg/L to 0.040 mg/L, measured on November 11, 2014, at the Bad River @ Government Road site and on November 6, 2014, at the White River @ Hanson Swamp site, respectively. The in stream monitoring that occurred prior to, during, and after the bypass demonstrates that this short-term discharge, which was necessary to improve the performance of the WWTP, did not result in TP concentrations above the screening threshold.

⁵ The screening threshold of 0.075 mg/L for TP is the most stringent TP criteria applicable to streams and river adopted by Wisconsin (NR 102.06(3)). Although Wisconsin's criteria is not applicable to waters within the Bad River Reservation, the Bad River Natural Resources Department utilizes this threshold to determine if TP concentrations in streams and rivers are elevated.

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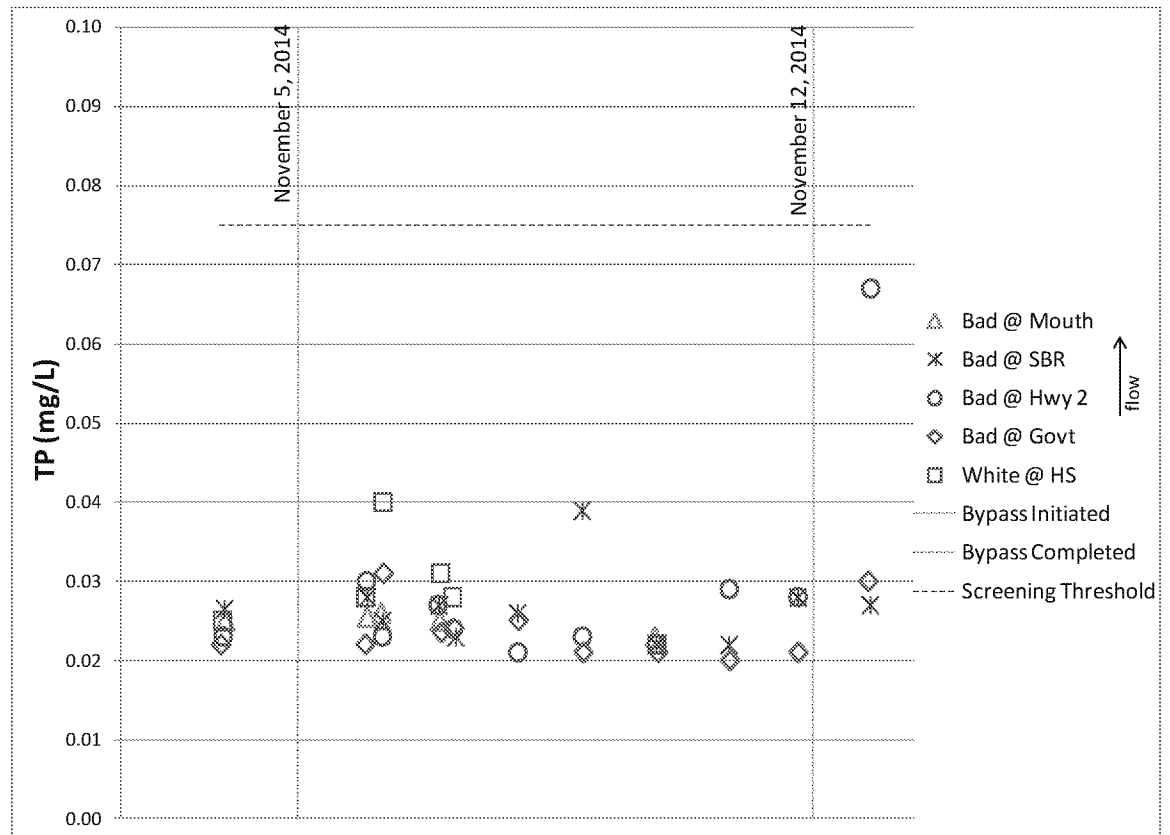


Figure 3: TP concentrations measured from November 4, 2014, to November 13, 2014, at four Bad River sites and one White River site.

Significant precipitation was measured at the Tribe's weather station during the bypass period; this weather station is located in Odanah. The total precipitation received from November 10 through November 12 was 1.4 inches. Figure 4 provides the discharge measured at the White River station operated by USGS; this gaging station is downstream of the hydro dam operated by Xcel Energy.

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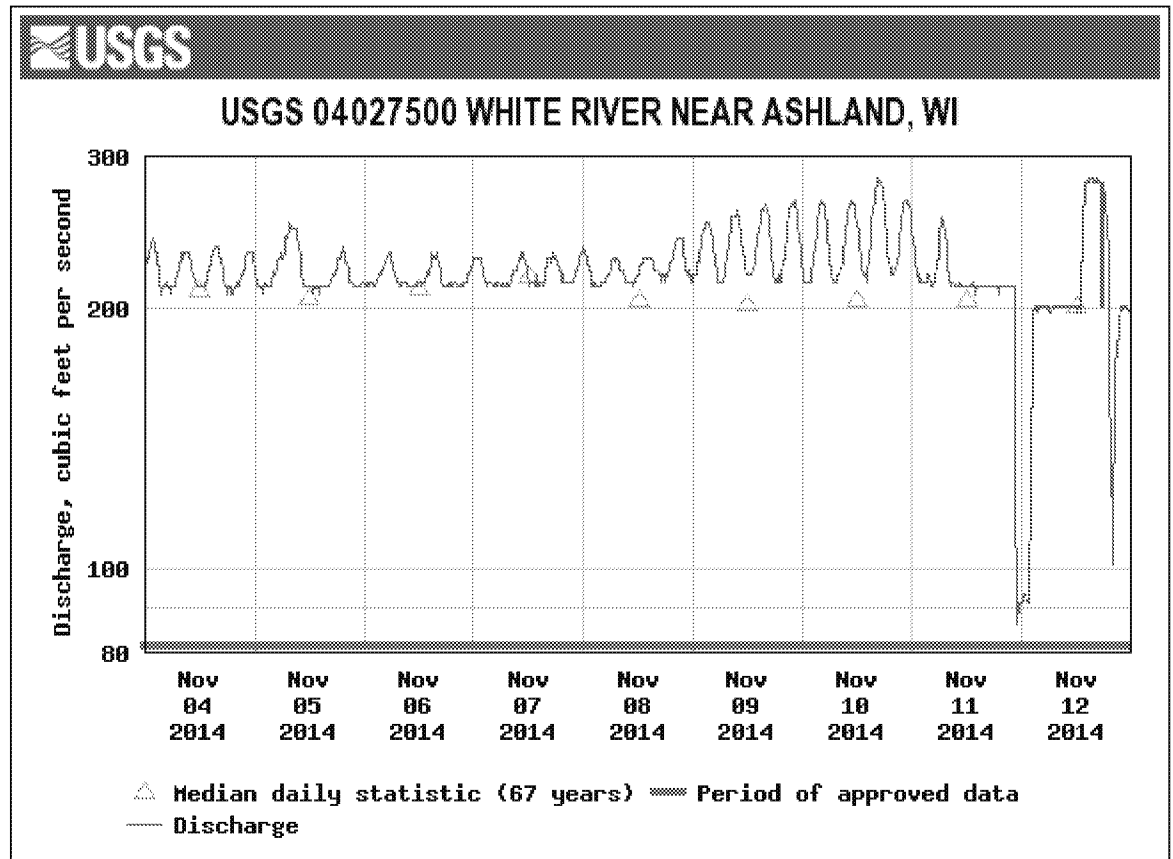


Figure 4: The flow of the White River from November 4, 2014, to November 12, 2014, as measured at the USGS station located at downstream of a hydro dam.⁶

⁶ Graph produced from USGS National Water Information System, accessed 2/9/16:
http://waterdata.usgs.gov/wi/nwis/uv?site_no=04027500